The VVER-440 Burnup Credit Computational Benchmark Used for the SCALE System Qualification

Branislav Vrban[1, 2, a)], Jakub Lüley[1, 2, b)], Štefan Čerba[1, c)], Filip Osuský[1, d)] and Vladimír Nečas[1, e)]

[1]*Slovak University of Technology in Bratislava, Faculty of Electrical Engineering and Information Technology, Institute of Nuclear and Physical Engineering, Ilkovičova 3, 812 19 Bratislava, Slovakia.*
[2]*B&J NUCLEAR ltd., Alžbetin Dvor 145, 900 42 Miloslavov, Slovakia.*

[a)]Corresponding author: branislav.vrban@stuba.sk
[b)]jakub.luley@stuba.sk, [c)]stefan.cerba@stuba.sk, [d)]filip.osusky@stuba.sk, [e)]vladimir.necas@stuba.sk

Abstract. To assess the ability of the SCALE system and the associated nuclear data to predict the VVER-440 spent fuel nuclide composition, the measured compositions of Novovoronezh NPP irradiated fuel assembly are compared to data calculated by TRITON sequence. The samples of fuel assembly with 3.6 wt. % ^{235}U enrichment underwent 4-cycle campaign of totally 1109 days in the core and cooling period of 1-13 years. The simplified benchmark specification is based on operational history calculated by the Russian operational codes. Calculated concentrations are compared to measured values burdened with their experimental uncertainties for totally 47 nuclides. Calculated results show overall a good agreement for all nuclides, differences from measured are pointed out and discussed in the paper.